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RECENTLY PUBLISHED RESEARCH OF THE
SIBIRIAN, HYDROTECHNOLOGICAL INSTITUTE,
TOMSK STATE UNIVERSITY IMENI V. V. KUYBYSHEV

"Electrical Conductivity and Viscosity of Concentrated Solutions of Zinc Nitrate," B. V. Barh, Siberian Phys. Tech Inst, Tomsk. State U imeni V. V. Kuznetsov

"Zhur Obsheh Khimii," Vol 16, 1946, pp 395-400

The electrical conductivity and viscosity of aqueous solutions of $\text{Zn}(\text{NO}_3)_2$ were measured up to 79.2% concentration. The electrical conductivity isotherms have minima corresponding to trihydrate, and at lower temperatures to hexahydrate, with temperature range being $20^\circ - 80^\circ$. The curves of viscosity are smooth and do not have any singular points, but the temperature coefficient of internal friction has a maximum at the hexahydrate composition.

"Electric Conductivity and Viscosity of the System H_2SO_4/CH_3COOH ," M. Usanovich, V. Tartakovskaya, Siberian Phys Tech Inst, Tomsk State U imeni V. V. Kuybyshev and Kazakh State U

"Zhur Obshch Khimii," Vol 16, 1946, pp 1987-90

Electric conductivity k was measured at 20° from 100 to 71.8 molecular % H_2SO_4 ; at 40° from 100 to 37.6 molecular % at 60° from 100 to 0.78 molecular %; k falls continuously and rapidly from $0.939\text{-ohm}^{-1}\text{cm}^{-1}$ for pure H_2SO_4 (at 60°) to practically zero for pure $\text{C}_6\text{H}_5\text{COOH}$; the curves for 20° and 40° are parallel to that for 60° , k falling to very nearly zero at

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the compositions given above. The curve of molecular conductivity Λ for H_2SO_4 falls abruptly to nearly zero at dilution of about 100:1 and remains fairly constant on further dilution. The average temperature coefficient of k between 40 and 60° is about 3%. The viscosity η falls uniformly from pure H_2SO_4 ($\eta=0.105$ at 60°) to pure CCl_3COOH ($\eta=0.038$); the curve is convex to the axis composition and is characteristic of a system of noninteracting associating components. The abnormal shape of k and Λ curves can be interpreted by ascribing the electric conductivity to ionization of sulfonium sulfate (Hantzsch) formed through association of H_2SO_4 due to its amphoteric nature; dilution with the indifferent solvent CCl_3COOH results in decomposition into the simple H_2SO_4 molecules, not susceptible of ionization in that medium.

"Concentration and Distribution of Electrode Materials in the Arc and the Spark Discharge," N. A. Prilezhaeva, N. K. Rubtsova, V. P. Sychev, Siberian Phys Tech Inst, Tomsk State U imeni V. V. Kuybyshev

"Iz Ak Nauk SSSR, Ser Fiz" Vol 11, 1947, pp 239-45

The radiation emitted in an arc discharge between Cu electrodes was absorbed in an arc or a spark discharge between Cu or Ag-Cu (16%) electrodes. The ratios of the duration of excited states T_{5105}/T_{5105} and $45153/175105$ were found to be in good agreement with previously published results. The distribution of Na in a C arc and of Al or Ag in a Cu arc show that, along with diffusion, field action of positive ions is very considerable. In a spark discharge the distribution depends on a diffusion.

"Temperature and Absolute Intensity of Spectral Lines in a Low-Pressure Arc," O. P. Semenova, Siberian Phys Tech Inst, Tomsk State U imeni V. V. Kuybyshev

"Iz Ak Nauk SSSR, Ser Fiz," Vol 11, 1947, pp 246-51

A study of the intensities of Cu lines 5105 Å and 5135 Å in a C arc discharge burning in a container in which the air pressure can be verified shows that the effective temperature of the arc decreases from atmospheric pressure to approximately 270 mm, from which it increases again owing to an increased ionization by higher-energy electrons. The intensity of the Cu lines has a first maximum at about 450 mm, a minimum at 270 mm, and a second sharp maximum around 180 mm, from which the intensity drops owing to a decrease of Cu atoms in the discharge. Action of collisions of the second kind was studied on Cu lines in a Cd-vapor discharge.

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"The Width of the Lithium Line at 4132 Å and the Electron Concentration in the Arc Discharge," V. I. Danilova, Siberian Phys Tech Inst, Tomsk State U imeni V. V. Kuybyshev

"Iz Ak Nauk SSSR, Ser Fiz" Vol 11, 1947, pp 252-9

A direct current arc was struck between C electrodes. A channel in the electrodes was filled with a mixture containing 10% Li_2CO_3 with variable amounts of Na_2CO_3 , K_2CO_3 , and ZnSO_4 . It was found that the width of the 4132 Å line is linearly dependent on the concentration of K and Na and independent of the Zn concentration. This is due to a change in the diameter of the arc and therefore to a change in current density and electron concentration. Zn does not increase the diameter because of its high ionization potential. Variation of current density at constant concentration of salts changes the diameter of the arc for Zn and does not affect the diameter in arcs containing Na and K. The width of the line is linearly proportional to the current density. The temperature of the positive electrode was determined to be 5480° K by the relative intensities of the lines Cu 5153 and 5105 Å. On assuming that the widening of the line is due to collisions with electrons the electron concentration calculated from the equation of Unsöld is substantiated by experiment.

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